

UNITED STATES NAVAL OBSERVATORY

C I R C U L A R N O . 1 2 2

U. S. Naval Observatory, Washington, D. C. 20390

October 11, 1968

Annular Solar Eclipse of 18 March 1969

by

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GENERAL INFORMATION

The path of the annular phase of the solar eclipse of 18 March 1969 touches the earth at sunrise in the Indian Ocean between Africa and Antarctica when the duration is $1^m 09^s.8$ and the width of path is 44 miles, and travels in a north-easterly direction, passing northwest of Australia. Central eclipse occurs at $4^h 37^m.7$ U. T. at latitude $-19^\circ 11'.5$, and longitude $-112^\circ 37'.2$, when the duration is 21.8 seconds and the width of path is 9 miles.

The path crosses the island of Sumba between $5^h 12^m$ U. T. and $5^h 14^m$ U. T. and continues in a northeasterly direction crossing the islands of Flores, Buru, Obi, and several small islands northwest of New Guinea. The path then passes to the south of the Palau Islands and south of Guam in the Mariana Islands. It continues in an easterly direction passing north of Eniwetok in the Marshall Islands. The path of the annular phase leaves the earth at sunset in the North Pacific between latitude $+13^\circ$ and $+14^\circ$, and at longitude -172° when the duration is $1^m 15^s.2$ and the width of path is 47 miles.

Partial phases of the eclipse are visible generally over part of Antarctica, all of Australia, Indonesia, New Guinea, the Philippine Islands, and southeastern Asia, and Japan.

The predictions in this *Circular* are derived from the basic data given in the American Ephemeris and Nautical Almanac for the Year 1969. The arguments are in Universal Time, and the longitudes east of Greenwich are negative. The position of the sun was referred to the equinox of FK4 by applying a correction of $1^s.34$. The value of ΔT , used in the computations, is 37.9 seconds.

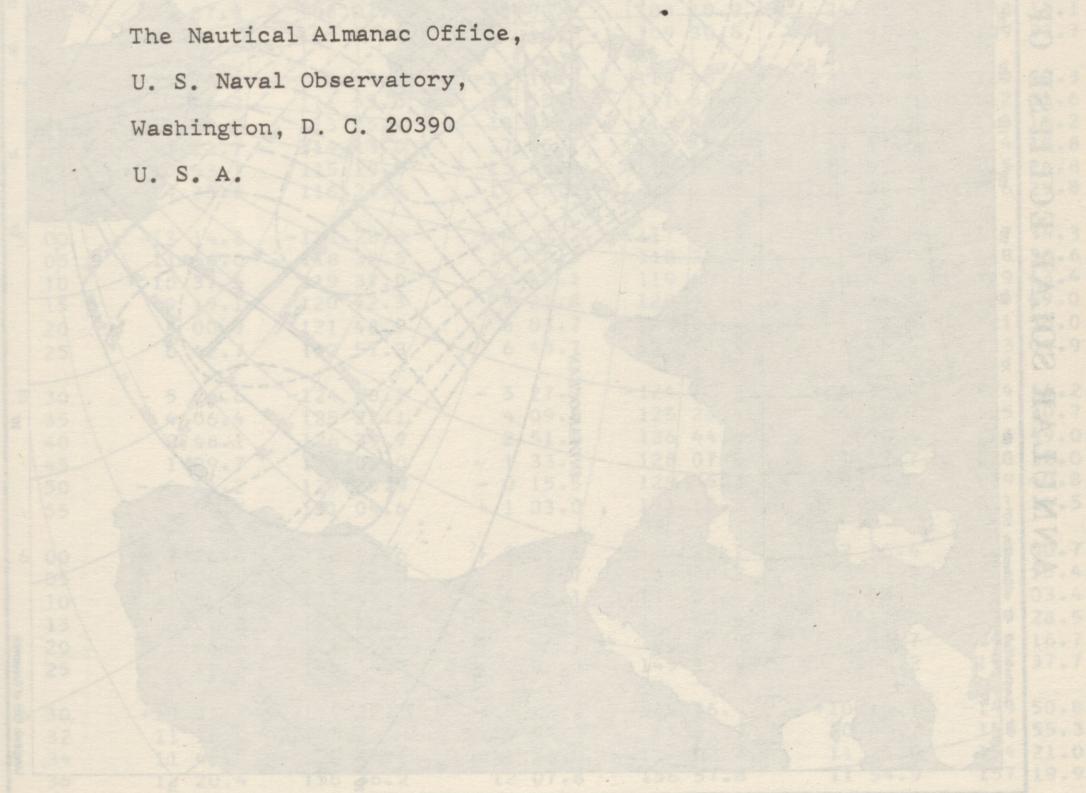
The value of 0.2724807 for k has been used in these computations. In the local circumstances, the angle P is the position angle of the point of contact, measured eastward from the north point of the solar limb, and the angle V is the position angle of the point of contact, measured eastward from the vertical circle. The duration tabulated in the local circumstances is derived from the second and third contacts.

The circumstances of the eclipse are plotted by the Nautical Almanac Office, the Publications of the Air Navigation Charts Series V30, and the Operations Control Center Plotting/Display Charts 17,000 Series of the U. S. Naval Oceanographic Office.

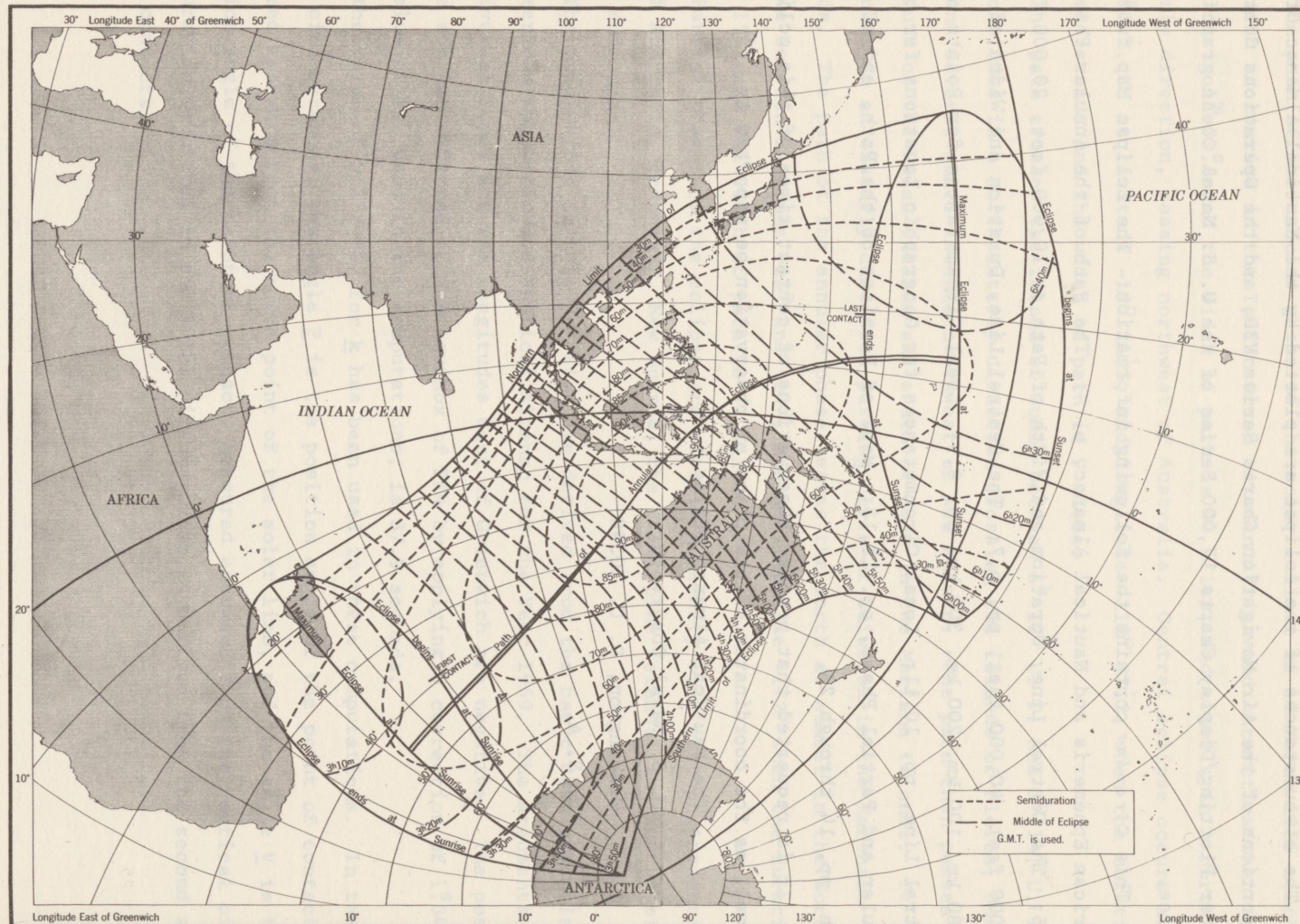
This *Circular* contains the following information: The Eclipse Map from the American Ephemeris and Nautical Almanac, p. 4; The Path of the Annular Phase, p. 5; The Central Line, Duration and Width of Path at 10,000 feet, 20,000 feet, 30,000 feet, 40,000 feet, pp. 6,7; The Central Line, Duration and Width of Path at 80 km, 100 km, 200 km, 300 km, pp. 8,9; Local Circumstances for Points on the Central Line, pp. 10,11; Local Circumstances for Geographic Locations for both Annular and Partial Phase, pp. 12,13; Maps of Portions of the Path, and of the Path, pp. 14 through 23.

It is requested that precise observations of contact times of this eclipse, as well as the coordinates of the place of observation be reported to

The Nautical Almanac Office,
U. S. Naval Observatory,
Washington, D. C. 20390
U. S. A.



ANNULAR SOLAR ECLIPSE OF 1969 MARCH 18



PATH OF THE ANNULAR PHASE

Universal Time	Northern Limit		Central Line		Southern Limit	
	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
Limit	$-44^{\circ} 41'$	$-43^{\circ} 54'$	$-45^{\circ} 00'$	$-43^{\circ} 51'$	$-45^{\circ} 19'$	$-43^{\circ} 48'$
3 09	44 40.3	51 22.6	44 59.4	50 13.6	45 19.0	48 40.5
10	44 26.3	56 31.8	44 44.6	56 00.6	45 03.2	55 26.0
11	44 10.1	60 01.3	44 27.5	59 41.2	44 45.1	59 19.6
12	43 53.0	62 48.3	44 09.6	62 34.1	44 26.4	62 19.1
13	43 35.5	65 10.0	43 51.3	64 59.6	44 07.3	64 48.7
3 15	-42 59.5	-69 05.9	-43 14.1	-69 00.2	-43 28.8	-68 54.2
17	42 22.9	72 20.6	42 36.5	72 17.7	42 50.1	72 14.8
19	41 46.1	75 07.9	41 58.7	75 07.0	42 11.4	75 05.9
21	41 09.1	77 35.3	41 21.0	77 35.7	41 32.9	77 36.0
23	40 32.2	79 47.2	40 43.3	79 48.6	40 54.4	79 49.9
25	39 55.3	81 46.9	40 05.7	81 48.9	40 16.2	81 51.0
3 30	-38 23.5	-86 04.9	-38 32.5	-86 08.1	-38 41.6	-86 11.3
35	36 52.6	89 39.9	37 00.5	89 43.6	37 08.4	89 47.4
40	35 22.7	92 43.8	35 29.6	92 47.8	35 36.6	92 51.8
45	33 53.9	95 24.4	34 00.0	95 28.4	34 06.1	95 32.5
50	32 26.0	97 46.6	32 31.5	97 50.6	32 36.9	97 54.6
55	30 59.2	99 54.1	31 04.1	99 58.0	31 08.9	100 01.9
4 00	-29 33.3	-101 49.6	-29 37.6	-101 53.4	-29 42.0	-101 57.2
05	28 08.2	103 35.2	28 12.2	103 38.8	28 16.2	103 42.5
10	26 44.0	105 12.6	26 47.6	105 16.0	26 51.2	105 19.5
15	25 20.6	106 43.0	25 23.9	106 46.3	25 27.2	106 49.7
20	23 57.8	108 07.7	24 00.9	108 10.9	24 03.9	108 14.1
25	22 35.7	109 27.4	22 38.6	109 30.6	22 41.4	109 33.7
4 30	-21 14.2	-110 43.2	-21 16.9	-110 46.2	-21 19.6	-110 49.3
35	19 53.2	111 55.6	19 55.8	111 58.6	19 58.4	112 01.6
40	18 32.7	113 05.4	18 35.2	113 08.3	18 37.7	113 11.2
45	17 12.7	114 13.0	17 15.1	114 15.9	17 17.6	114 18.8
50	15 53.1	115 19.0	15 55.5	115 21.9	15 57.9	115 24.8
55	14 33.8	116 23.9	14 36.2	116 26.9	14 38.6	116 29.8
5 00	-13 14.8	-117 28.3	-13 17.2	-117 31.3	-13 19.6	-117 34.3
05	11 56.0	118 32.5	11 58.5	118 35.5	12 01.0	118 38.6
10	10 37.5	119 37.0	10 40.1	119 40.2	10 42.6	119 43.4
15	9 19.1	120 42.3	9 21.8	120 45.6	9 24.4	120 49.0
20	8 00.9	121 48.9	8 03.7	121 52.4	8 06.5	121 56.0
25	6 42.7	122 57.3	6 45.7	123 01.1	6 48.6	123 04.9
5 30	-5 24.6	-124 08.2	-5 27.7	-124 12.2	-5 30.9	-124 16.2
35	4 06.4	125 22.1	4 09.8	125 26.4	4 13.1	125 30.7
40	2 48.1	126 39.7	2 51.8	126 44.4	2 55.4	126 49.0
45	1 29.7	128 02.0	1 33.7	128 07.0	1 37.7	128 12.0
50	-0 11.2	129 29.9	-0 15.5	129 35.3	-0 19.8	129 40.8
55	+1 07.7	131 04.6	+1 03.0	131 10.5	+0 58.2	131 16.5
6 00	+2 26.8	-132 47.6	+2 21.6	-132 54.1	+2 16.4	-133 00.7
05	3 46.4	134 41.0	3 40.7	134 48.2	3 34.8	134 55.4
10	5 06.5	136 47.4	5 00.1	136 55.4	4 53.7	137 03.4
15	6 27.3	139 10.6	6 20.1	139 19.6	6 12.9	139 28.5
20	7 48.8	141 56.4	7 40.8	142 06.5	7 32.7	142 16.7
25	9 11.5	145 14.2	9 02.4	145 25.9	8 53.2	145 37.7
6 30	+10 35.7	-149 22.1	+10 25.2	-149 36.4	+10 14.7	-149 50.8
32	11 10.0	151 23.4	10 58.9	151 39.3	10 47.7	151 55.3
34	11 44.8	153 44.6	11 33.0	154 02.7	11 21.0	154 21.0
36	12 20.4	156 36.2	12 07.8	156 57.8	11 54.9	157 19.9
6 38	+12 57.4	-160 23.6	+12 43.6	-160 52.8	+12 29.6	-161 23.2
39	13 16.9	163 02.2	13 02.5	163 40.9	12 47.8	164 22.7
40	13 38.6	167 15.8	13 23.8	168 42.6	.. ..	.. ..
Limit	+13 50	-171 43	+13 30	-171 46	+13 09	-171 49

CENTRAL LINE OF ANNULAR ECLIPSE

Universal Time	10,000 Feet		20,000 Feet		30,000 Feet		40,000 Feet	
	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
3 09	-44 58.3	- 50 41.5	-44 57.2	- 51 07.6	-44 56.0	- 51 32.2	-44 54.8	- 51 55.5
10	44 43.2	56 15.1	44 41.9	56 29.3	44 40.5	56 43.3	44 39.2	56 57.0
11	44 26.1	59 52.1	44 24.7	60 02.8	44 23.3	60 13.4	44 21.9	60 23.9
12	44 08.2	62 43.1	44 06.8	62 52.0	44 05.4	63 00.8	44 03.9	63 09.5
13	43 49.9	65 07.4	43 48.5	65 15.0	43 47.1	65 22.6	43 45.6	65 30.2
3 15	-43 12.7	- 69 06.3	-43 11.3	- 69 12.4	-43 09.9	- 69 18.5	-43 08.4	- 69 24.6
17	42 35.1	72 22.9	42 33.7	72 28.0	42 32.3	72 33.1	42 30.9	72 38.2
19	41 57.3	75 11.4	41 56.0	75 15.9	41 54.6	75 20.3	41 53.2	75 24.7
21	41 19.6	77 39.6	41 18.3	77 43.5	41 16.9	77 47.4	41 15.6	77 51.3
23	40 42.0	79 52.1	40 40.6	79 55.6	40 39.3	79 59.0	40 38.0	80 02.5
25	40 04.4	81 52.1	40 03.1	81 55.2	40 01.8	81 58.3	40 00.5	82 01.4
3 30	-38 31.3	- 86 10.6	-38 30.1	- 86 13.1	-38 28.8	- 86 15.5	-38 27.6	- 86 18.0
35	36 59.3	89 45.6	36 58.1	89 47.6	36 57.0	89 49.6	36 55.8	89 51.6
40	35 28.5	92 49.5	35 27.4	92 51.1	35 26.3	92 52.8	35 25.2	92 54.4
45	33 58.9	95 29.8	33 57.9	95 31.2	33 56.8	95 32.6	33 55.8	95 33.9
50	32 30.5	97 51.8	32 29.5	97 52.9	32 28.5	97 54.0	32 27.5	97 55.2
55	31 03.1	99 59.0	31 02.2	99 59.9	31 01.2	100 00.9	31 00.3	100 01.8
4 00	-29 36.8	-101 54.2	-29 35.9	-101 55.0	-29 35.0	-101 55.7	-29 34.1	-101 56.5
05	28 11.4	103 39.5	28 10.5	103 40.1	28 09.7	103 40.8	28 08.8	103 41.4
10	26 46.8	105 16.6	26 46.0	105 17.1	26 45.3	105 17.6	26 44.5	105 18.1
15	25 23.1	106 46.7	25 22.4	106 47.2	25 21.6	106 47.6	25 20.9	106 48.0
20	24 00.2	108 11.2	23 59.5	108 11.5	23 58.8	108 11.8	23 58.1	108 12.1
25	22 37.9	109 30.8	22 37.3	109 31.0	22 36.6	109 31.2	22 36.0	109 31.4
4 30	-21 16.3	-110 46.3	-21 15.7	-110 46.5	-21 15.1	-110 46.6	-21 14.5	-110 46.7
35	19 55.2	111 58.6	19 54.7	111 58.7	19 54.1	111 58.7	19 53.6	111 58.8
40	18 34.7	113 08.3	18 34.2	113 08.2	18 33.7	113 08.2	18 33.2	113 08.1
45	17 14.7	114 15.8	17 14.2	114 15.7	17 13.7	114 15.6	17 13.2	114 15.5
50	15 55.0	115 21.7	15 54.6	115 21.6	15 54.1	115 21.4	15 53.7	115 21.2
55	14 35.8	116 26.6	14 35.4	116 26.4	14 35.0	116 26.1	14 34.6	116 25.9
5 00	-13 16.8	-117 30.9	-13 16.5	-117 30.6	-13 16.1	-117 30.3	-13 15.8	-117 30.0
05	11 58.2	118 35.2	11 57.9	118 34.8	11 57.6	118 34.4	11 57.2	118 34.0
10	10 39.8	119 39.7	10 39.5	119 39.3	10 39.2	119 38.8	10 38.9	119 38.3
15	9 21.5	120 45.1	9 21.3	120 44.6	9 21.1	120 44.0	9 20.8	120 43.5
20	8 03.5	121 51.8	8 03.3	121 51.2	8 03.1	121 50.6	8 02.9	121 50.0
25	6 45.5	123 00.4	6 45.3	122 59.7	6 45.2	122 59.1	6 45.0	122 58.4
5 30	- 5 27.6	-124 11.4	- 5 27.5	-124 10.7	- 5 27.3	-124 09.9	- 5 27.2	-124 09.2
35	4 09.7	125 25.5	4 09.6	125 24.7	4 09.5	125 23.8	4 09.4	125 23.0
40	2 51.7	126 43.4	2 51.7	126 42.5	2 51.6	126 41.6	2 51.6	126 40.6
45	1 33.7	128 06.0	1 33.7	128 04.9	1 33.7	128 03.9	1 33.6	128 02.9
50	- 0 15.5	129 34.2	- 0 15.5	129 33.0	- 0 15.6	129 31.9	- 0 15.6	129 30.7
55	+ 1 02.9	131 09.2	+ 1 02.8	131 08.0	+ 1 02.8	131 06.7	+ 1 02.7	131 05.4
6 00	+ 2 21.5	-132 52.7	+ 2 21.4	-132 51.3	+ 2 21.3	-132 49.9	+ 2 21.2	-132 48.5
05	3 40.5	134 46.6	3 40.4	134 45.0	3 40.2	134 43.4	3 40.1	134 41.8
10	4 59.9	136 53.6	4 59.8	136 51.8	4 59.6	136 50.0	4 59.4	136 48.2
15	6 19.9	139 17.5	6 19.7	139 15.4	6 19.4	139 13.4	6 19.2	139 11.3
20	7 40.5	142 04.1	7 40.2	142 01.7	7 40.0	141 59.3	7 39.7	141 56.9
25	9 02.1	145 23.0	9 01.7	145 20.2	9 01.4	145 17.3	9 01.1	145 14.4
6 30	+10 24.9	-149 32.7	+10 24.5	-149 29.1	+10 24.1	-149 25.4	+10 23.7	-149 21.8
32	10 58.5	151 35.1	10 58.1	151 31.0	10 57.7	151 26.9	10 57.3	151 22.7
34	11 32.6	153 57.8	11 32.2	153 53.0	11 31.7	153 48.1	11 31.3	153 43.3
36	12 07.3	156 51.8	12 06.8	156 45.8	12 06.4	156 39.9	12 05.9	156 34.0
6 38	+12 43.1	-160 44.4	+12 42.6	-160 36.0	+12 42.1	-160 27.8	+12 41.6	-160 19.6
39	13 01.9	163 29.3	13 01.3	163 18.0	13 00.8	163 06.9	13 00.2	162 56.0
40	+13 22.8	-168 12.9	+13 22.0	-167 46.9	+13 21.2	-167 23.5	+13 20.4	-167 02.0

DURATION OF ANNULAR PHASE AND WIDTH OF PATH ON CENTRAL LINE

Universal Time	10,000 Feet		20,000 Feet		30,000 Feet		40,000 Feet	
	Duration	Width of Path	Duration	Width of Path	Duration	Width of Path	Duration	Width of Path
^h ^m ^s	^m ^s	^{mi}	^m ^s	^{mi}	^m ^s	^{mi}	^m ^s	^{mi}
3 09	1 06.9	40	1 06.7	40	1 06.5	40	1 06.4	40
10	1 04.3	37	1 04.2	37	1 04.1	37	1 04.0	37
11	1 02.6	36	1 02.5	36	1 02.4	35	1 02.3	35
12	1 01.1	34	1 01.0	34	1 00.9	34	1 00.8	33
13	0 59.7	33	0 59.7	33	0 59.6	33	0 59.5	33
3 15	0 57.4	31	0 57.4	30	0 57.3	30	0 57.2	30
17	0 55.4	29	0 55.3	29	0 55.3	29	0 55.2	29
19	0 53.6	27	0 53.5	27	0 53.4	27	0 53.4	27
21	0 51.9	26	0 51.8	26	0 51.8	26	0 51.7	25
23	0 50.2	25	0 50.2	25	0 50.1	25	0 50.1	25
25	0 48.7	24	0 48.7	24	0 48.6	24	0 48.6	24
3 30	0 45.2	21	0 45.2	21	0 45.2	21	0 45.1	21
35	0 42.1	19	0 42.1	19	0 42.0	19	0 42.0	19
40	0 39.3	17	0 39.2	17	0 39.2	17	0 39.2	17
45	0 36.7	16	0 36.7	16	0 36.6	16	0 36.6	16
50	0 34.4	14	0 34.3	14	0 34.3	14	0 34.2	14
55	0 32.2	13	0 32.1	13	0 32.1	13	0 32.1	14
4 00	0 30.3	13	0 30.2	13	0 30.2	13	0 30.1	13
05	0 28.5	12	0 28.5	12	0 28.4	12	0 28.4	12
10	0 27.0	11	0 26.9	11	0 26.9	11	0 26.8	11
15	0 25.6	10	0 25.6	10	0 25.5	10	0 25.5	10
20	0 24.5	10	0 24.4	10	0 24.4	10	0 24.3	10
25	0 23.5	10	0 23.4	10	0 23.4	10	0 23.3	10
4 30	0 22.7	9	0 22.6	9	0 22.6	9	0 22.6	9
35	0 22.1	9	0 22.0	9	0 22.0	9	0 21.9	9
40	0 21.6	9	0 21.6	9	0 21.6	9	0 21.5	9
45	0 21.4	9	0 21.4	9	0 21.3	9	0 21.3	9
50	0 21.4	9	0 21.3	9	0 21.3	9	0 21.2	9
55	0 21.5	9	0 21.4	9	0 21.4	9	0 21.4	9
5 00	0 21.8	9	0 21.8	9	0 21.7	9	0 21.7	9
05	0 22.3	9	0 22.2	9	0 22.2	9	0 22.2	9
10	0 23.0	10	0 22.9	10	0 22.9	10	0 22.8	10
15	0 23.8	10	0 23.8	10	0 23.7	10	0 23.7	10
20	0 24.8	10	0 24.8	10	0 24.8	10	0 24.7	10
25	0 26.1	11	0 26.0	11	0 26.0	11	0 25.9	11
5 30	0 27.4	12	0 27.4	12	0 27.3	12	0 27.3	12
35	0 29.0	13	0 29.0	13	0 28.9	13	0 28.9	13
40	0 30.7	13	0 30.7	13	0 30.6	13	0 30.6	14
45	0 32.6	14	0 32.6	14	0 32.6	14	0 32.5	14
50	0 34.8	16	0 34.7	16	0 34.7	16	0 34.6	16
55	0 37.0	17	0 37.0	17	0 37.0	17	0 36.9	17
6 00	0 39.5	18	0 39.5	18	0 39.4	18	0 39.4	18
05	0 42.2	20	0 42.2	20	0 42.1	20	0 42.1	20
10	0 45.1	22	0 45.0	22	0 45.0	22	0 44.9	22
15	0 48.2	24	0 48.1	24	0 48.1	24	0 48.1	24
20	0 51.6	26	0 51.5	26	0 51.5	26	0 51.5	26
25	0 55.3	29	0 55.3	29	0 55.2	29	0 55.2	29
6 30	0 59.5	33	0 59.5	33	0 59.4	33	0 59.4	32
32	1 01.4	34	1 01.4	33	1 01.3	33	1 01.3	33
34	1 03.5	36	1 03.4	36	1 03.4	36	1 03.3	35
36	1 05.8	37	1 05.7	37	1 05.7	37	1 05.6	37
6 38	1 08.6	40	1 08.6	40	1 08.5	40	1 08.4	40
39	1 10.5	42	1 10.3	42	1 10.2	42	1 10.1	41
40	1 13.3	45	1 13.1	44	1 12.8	44	1 12.6	44

CENTRAL LINE OF ANNULAR ECLIPSE

Universal Time	80 Km		100 Km		200 Km		300 Km	
	Latitude h m	Longitude ° ′	Latitude ° ′	Longitude ° ′	Latitude ° ′	Longitude ° ′	Latitude ° ′	Longitude ° ′
3 04	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	-44 11.7	-53 50.9
05	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	43 56.7	58 22.0
06	.. ..	.. ..	.. ..	.. ..	-44 22.5	-54 40.4	43 40.4	61 34.7
07	.. ..	.. ..	-44 46.5	-48 24.8	44 06.7	58 50.1	43 23.4	64 10.8
08	-44 41.7	-53 28.9	44 33.4	55 22.9	43 49.8	61 55.1	43 06.1	66 24.1
3 09	-44 25.8	-57 57.9	-44 17.0	-59 16.3	-43 32.4	-64 27.2	-42 48.6	-68 21.7
11	43 50.8	63 50.2	43 41.7	64 43.4	42 56.8	68 34.2	42 13.2	71 43.8
13	43 14.4	68 05.3	43 05.3	68 47.0	42 20.7	71 54.6	41 37.6	74 35.1
15	42 37.5	71 31.2	42 28.5	72 05.9	41 44.4	74 45.1	41 01.9	77 04.5
3 20	-41 04.6	-78 08.1	-40 55.9	-78 32.8	-40 13.6	-80 28.7	-39 32.9	-82 13.5
25	39 32.1	83 08.5	39 23.8	83 27.5	38 43.5	84 57.6	38 04.6	86 20.6
30	38 00.5	87 11.3	37 52.7	87 26.5	37 14.3	88 39.1	36 37.3	89 46.7
35	36 30.1	90 35.0	36 22.6	90 47.4	35 46.2	91 47.1	35 11.0	92 43.0
3 40	-35 00.8	-93 30.3	-34 53.7	-93 40.6	-34 19.1	-94 30.1	-33 45.8	-95 16.9
45	33 32.7	96 03.7	33 26.0	96 12.3	32 53.2	96 53.8	32 21.6	97 33.0
50	32 05.6	98 20.0	31 59.3	98 27.2	31 28.3	99 01.9	30 58.3	99 34.9
55	30 39.6	100 22.5	30 33.6	100 28.5	30 04.3	100 57.5	29 35.9	101 25.2
4 00	-29 14.6	-102 13.7	-29 08.9	-102 18.7	-28 41.2	-102 42.8	-28 14.4	-103 05.8
05	27 50.5	103 55.5	27 45.1	103 59.5	27 19.0	104 19.4	26 53.7	104 38.3
10	26 27.2	105 29.4	26 22.1	105 32.7	25 57.5	105 48.7	25 33.7	106 04.0
15	25 04.7	106 56.8	24 59.9	106 59.4	24 36.8	107 12.0	24 14.4	107 24.0
20	23 42.9	108 18.7	23 38.4	108 20.7	23 16.7	108 30.1	22 55.8	108 39.1
25	22 21.7	109 36.0	22 17.6	109 37.3	21 57.3	109 43.9	21 37.7	109 50.2
4 30	-21 01.2	-110 49.4	-20 57.4	-110 50.2	-20 38.5	-110 54.1	-20 20.2	-110 57.8
35	19 41.2	111 59.7	19 37.7	112 00.0	19 20.1	112 01.3	19 03.1	112 02.6
40	18 21.8	113 07.4	18 18.5	113 07.2	18 02.2	113 06.1	17 46.5	113 05.1
45	17 02.8	114 13.1	16 59.7	114 12.4	16 44.8	114 09.0	16 30.3	114 05.8
50	15 44.1	115 17.3	15 41.4	115 16.1	15 27.7	115 10.5	15 14.5	115 05.1
55	14 25.9	116 20.4	14 23.4	116 18.8	14 11.0	116 11.0	13 59.0	116 03.5
5 00	-13 08.0	-117 23.0	-13 05.7	-117 21.0	-12 54.5	-117 11.0	-12 43.7	-117 01.4
05	11 50.3	118 25.5	11 48.3	118 23.0	11 38.3	118 10.9	11 28.7	117 59.2
10	10 32.8	119 28.3	10 31.1	119 25.4	10 22.4	119 11.1	10 13.9	118 57.3
15	9 15.6	120 31.9	9 14.1	120 28.6	9 06.6	120 12.1	8 59.3	119 56.1
20	7 58.5	121 36.8	7 57.2	121 33.0	7 50.9	121 14.2	7 44.8	120 56.0
25	6 41.4	122 43.5	6 40.4	122 39.2	6 35.3	122 18.0	6 30.4	121 57.6
5 30	-5 24.5	-123 52.5	-5 23.7	-123 47.7	-5 19.8	-123 24.0	-5 16.0	-123 01.2
35	4 07.5	125 04.5	4 07.0	124 59.1	4 04.2	124 32.8	4 01.6	124 07.4
40	2 50.5	126 20.1	2 50.2	126 14.1	2 48.7	125 45.0	2 47.2	125 16.8
45	1 33.4	127 40.1	1 33.4	127 33.5	1 33.0	127 01.3	1 32.7	126 30.2
50	-0 16.2	129 05.5	-0 16.4	128 58.3	-0 17.2	128 22.6	-0 18.1	127 48.2
55	+1 01.2	130 37.5	+1 00.8	130 29.4	+0 58.7	129 49.9	+0 56.7	129 11.9
6 00	+2 18.9	-132 17.4	+2 18.2	-132 08.4	+2 14.9	-131 24.5	+2 11.7	-130 42.4
05	3 36.9	134 07.1	3 36.0	133 57.0	3 31.4	133 08.1	3 27.0	132 21.3
10	4 55.3	136 09.0	4 54.1	135 57.7	4 48.3	135 02.8	4 42.7	134 10.3
15	6 14.2	138 26.6	6 12.7	138 13.8	6 05.6	137 11.4	5 58.7	136 12.2
20	7 33.7	141 05.0	7 32.0	140 50.1	7 23.5	139 38.3	7 15.3	138 30.5
25	8 54.1	144 12.4	8 52.1	143 54.7	8 42.2	142 30.0	8 32.6	141 10.8
6 30	+10 15.6	-148 03.8	+10 13.3	-147 41.8	+10 01.8	-145 57.7	+9 50.8	-144 22.2
35	11 38.9	153 13.8	11 36.2	152 43.5	11 22.9	150 24.7	11 10.2	148 22.0
40	13 06.6	162 02.5	13 03.1	161 00.8	12 46.6	156 57.8	12 31.6	153 52.9
6 41	+13 26.1	-165 36.3	+13 21.9	-164 01.4	+13 04.0	-158 50.8	+12 48.3	-155 19.6
43	.. ..	.. ..	.. ..	.. ..	+13 40.9	-164 27.5	13 22.5	158 55.4
6 44	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	+13 40.3	-161 22.5
45	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	+13 59.5	-165 02.0

DURATION OF ANNULAR PHASE AND WIDTH OF PATH ON CENTRAL LINE

Universal Time	80 Km		100 Km		200 Km		300 Km	
	Duration	Width of Path	Duration	Width of Path	Duration	Width of Path	Duration	Width of Path
h m	m s	mi	m s	mi	m s	mi	m s	mi
3 04	. . . .	...	. . . .	...	. . . .	...	1 05.7	39
05	. . . .	...	. . . .	...	. . . .	...	1 03.4	37
06	. . . .	...	. . . .	...	1 05.2	38	1 01.7	35
07	. . . .	...	1 08.0	42	1 03.1	36	1 00.2	33
08	1 05.7	39	1 04.8	38	1 01.5	34	0 58.9	32
3 09	1 03.5	36	1 02.9	35	1 00.1	33	0 57.7	31
11	1 00.4	34	0 59.9	33	0 57.6	31	0 55.5	29
13	0 58.0	31	0 57.5	31	0 55.4	29	0 53.5	27
15	0 55.8	29	0 55.4	29	0 53.5	27	0 51.6	26
3 20	0 51.3	26	0 51.0	25	0 49.2	24	0 47.5	22
25	0 47.5	22	0 47.1	23	0 45.5	21	0 43.9	20
30	0 44.0	20	0 43.7	20	0 42.2	19	0 40.6	18
35	0 40.9	18	0 40.6	19	0 39.1	17	0 37.6	17
3 40	0 38.1	17	0 37.9	17	0 36.3	16	0 34.8	15
45	0 35.6	15	0 35.3	15	0 33.8	15	0 32.3	13
50	0 33.2	14	0 32.9	14	0 31.5	13	0 30.0	12
55	0 31.1	13	0 30.8	13	0 29.3	12	0 27.8	12
4 00	0 29.1	12	0 28.9	12	0 27.4	11	0 25.9	11
05	0 27.4	11	0 27.1	11	0 25.7	11	0 24.2	10
10	0 25.9	10	0 25.6	10	0 24.1	10	0 22.7	9
15	0 24.5	10	0 24.2	10	0 22.8	9	0 21.3	8
20	0 23.4	10	0 23.1	9	0 21.6	8	0 20.2	7
25	0 22.4	9	0 22.1	9	0 20.7	8	0 19.2	7
4 30	0 21.6	9	0 21.3	8	0 19.9	7	0 18.4	7
35	0 21.0	8	0 20.7	8	0 19.3	7	0 17.8	7
40	0 20.6	8	0 20.3	8	0 18.8	7	0 17.4	7
45	0 20.3	8	0 20.1	8	0 18.6	7	0 17.2	7
50	0 20.3	8	0 20.0	8	0 18.5	7	0 17.1	7
55	0 20.4	8	0 20.1	8	0 18.7	7	0 17.2	7
5 00	0 20.7	8	0 20.4	8	0 19.0	7	0 17.5	7
05	0 21.2	9	0 20.9	8	0 19.5	7	0 18.0	7
10	0 21.9	9	0 21.6	9	0 20.2	8	0 18.7	7
15	0 22.7	10	0 22.5	9	0 21.0	8	0 19.6	7
20	0 23.8	10	0 23.5	10	0 22.1	9	0 20.6	8
25	0 25.0	10	0 24.7	10	0 23.3	10	0 21.8	9
5 30	0 26.3	11	0 26.1	11	0 24.6	11	0 23.2	10
35	0 27.9	12	0 27.6	12	0 26.2	11	0 24.8	10
40	0 29.7	13	0 29.4	13	0 28.0	12	0 26.5	12
45	0 31.6	14	0 31.3	14	0 29.9	13	0 28.4	12
50	0 33.7	15	0 33.4	15	0 32.0	14	0 30.5	13
55	0 36.0	16	0 35.7	16	0 34.3	16	0 32.8	15
6 00	0 38.4	18	0 38.2	18	0 36.7	17	0 35.3	16
05	0 41.1	19	0 40.8	19	0 39.4	19	0 37.9	17
10	0 44.0	21	0 43.7	21	0 42.2	20	0 40.8	19
15	0 47.1	23	0 46.8	23	0 45.3	22	0 43.8	21
20	0 50.4	26	0 50.1	25	0 48.6	25	0 47.1	23
25	0 54.1	28	0 53.8	28	0 52.2	27	0 50.6	26
6 30	0 58.2	31	0 57.8	31	0 56.2	29	0 54.5	28
35	1 03.0	35	1 02.6	35	1 00.7	33	0 58.9	32
40	1 09.7	41	1 09.0	40	1 06.3	38	1 04.0	36
6 41	1 12.0	43	1 11.1	43	1 07.8	39	1 05.3	37
43	. . . .	...	. . . .	...	1 11.6	43	1 08.0	39
6 44	. . . .	...	. . . .	...	. . . .	...	1 09.8	41
45	. . . .	...	. . . .	...	. . . .	...	1 12.2	44

LOCAL CIRCUMSTANCES FOR POINTS ON CENTRAL LINE

Universal Time		Central Line		First Contact			Second Contact		
Time		Latitude	Longitude	Time	P	V	Time	P	V
h	m	°	'	h	m	s	h	m	s
3	09	-44 59.4	- 50 13.6	..	..	..	3	08	26.5
	10	44 44.6	56 00.6	..	..	..	3	09	27.8
	11	44 27.5	59 41.2	2	07	43.0	3	10	28.7
	12	44 09.6	62 34.1	2	07	41.6	3	11	29.4
	13	43 51.3	64 59.6	2	07	47.7	3	12	30.1
3	15	-43 14.1	- 69 00.2	2	08	13.6	3	14	31.3
	17	42 36.5	72 17.7	2	08	51.3	3	16	32.3
	19	41 58.7	75 07.0	2	09	36.7	3	18	33.2
	21	41 21.0	77 35.7	2	10	27.9	3	20	34.1
	23	40 43.3	79 48.6	2	11	23.5	3	22	34.9
	25	40 05.7	81 48.9	2	12	22.7	3	24	35.6
3	30	-38 32.5	- 86 08.1	2	15	03.3	3	29	37.4
	35	37 00.5	89 43.6	2	17	57.8	3	34	38.9
	40	35 29.6	92 47.8	2	21	03.1	3	39	40.3
	45	34 00.0	95 28.4	2	24	17.5	3	44	41.6
	50	32 31.5	97 50.6	2	27	40.0	3	49	42.8
	55	31 04.1	99 58.0	2	31	09.5	3	54	43.9
4	00	-29 37.6	-101 53.4	2	34	45.8	3	59	44.9
	05	28 12.2	103 38.8	2	38	28.4	4	04	45.7
	10	26 47.6	105 16.0	2	42	16.9	4	09	46.5
	15	25 23.9	106 46.3	2	46	11.3	4	14	47.2
	20	24 00.9	108 10.9	2	50	11.2	4	19	47.8
	25	22 38.6	109 30.6	2	54	16.7	4	24	48.2
4	30	-21 16.9	-110 46.2	2	58	27.7	4	29	48.7
	35	19 55.8	111 58.6	3	02	44.0	4	34	49.0
	40	18 35.2	113 08.3	3	07	05.6	4	39	49.1
	45	17 15.1	114 15.9	3	11	32.7	4	44	49.3
	50	15 55.5	115 21.9	3	16	05.1	4	49	49.3
	55	14 36.2	116 26.9	3	20	43.0	4	54	49.3
5	00	-13 17.2	-117 31.3	3	25	26.2	4	59	49.1
	05	11 58.5	118 35.5	3	30	15.1	5	04	48.8
	10	10 40.1	119 40.2	3	35	09.7	5	09	48.5
	15	9 21.8	120 45.6	3	40	10.2	5	14	48.1
	20	8 03.7	121 52.4	3	45	16.7	5	19	47.6
	25	6 45.7	123 01.1	3	50	29.6	5	24	47.0
5	30	- 5 27.7	-124 12.2	3	55	49.0	5	29	46.3
	35	4 09.8	125 26.4	4	01	15.4	5	34	45.5
	40	2 51.8	126 44.4	4	06	49.2	5	39	44.6
	45	1 33.7	128 07.0	4	12	31.0	5	44	43.7
	50	- 0 15.5	129 35.3	4	18	21.1	5	49	42.6
	55	+ 1 03.0	131 10.5	4	24	20.5	5	54	41.5
6	00	+ 2 21.6	-132 54.1	4	30	30.1	5	59	40.2
	05	3 40.7	134 48.2	4	36	51.1	6	04	38.9
	10	5 00.1	136 55.4	4	43	24.9	6	09	37.4
	15	6 20.1	139 19.6	4	50	13.7	6	14	35.9
	20	7 40.8	142 06.5	4	57	20.5	6	19	34.2
	25	9 02.4	145 25.9	5	04	50.0	6	24	32.3
6	30	+10 25.2	-149 36.4	5	12	51.7	6	29	30.2
	32	10 58.9	151 39.3	5	16	17.3	6	31	29.3
	34	11 33.0	154 02.7	5	19	54.2	6	33	28.3
	36	12 07.8	156 57.8	5	23	47.6	6	35	27.1
6	38	+12 43.6	-160 52.8	5	28	11.3	6	37	25.6
	39	13 02.5	163 40.9	5	30	48.0	6	38	24.7
	40	+13 23.8	-168 42.6	5	34	29.6	6	39	23.2

LOCAL CIRCUMSTANCES FOR POINTS ON CENTRAL LINE

Maximum Eclipse					Third Contact				Fourth Contact				Dura- Width	
Universal	Magni-	Sun's	Universal	P	V	Universal	P	V	tion	of				
Time	tude	Alt. Az.	Time			Time				Path				
h m s		° °	h m s	°	°	h m s	°	°	m s	mi				
3 09 00.0	0.982	5 87	3 09 33.5	60	195	4 14 12.9	59	195	1 07.0	40				
3 10 00.0	0.984	9 83	3 10 32.2	59	194	4 17 23.9	58	195	1 04.4	37				
3 11 00.0	0.984	12 80	3 11 31.3	59	194	4 19 52.0	57	196	1 02.6	36				
3 12 00.0	0.985	14 78	3 12 30.6	58	193	4 22 03.8	56	196	1 01.2	34				
3 13 00.0	0.985	16 76	3 13 29.9	57	193	4 24 06.2	56	196	0 59.8	32				
3 15 00.0	0.986	19 73	3 15 28.7	56	192	4 27 53.5	55	196	0 57.4	31				
3 17 00.0	0.987	22 70	3 17 27.7	56	192	4 31 25.4	54	197	0 55.4	29				
3 19 00.0	0.988	25 67	3 19 26.8	55	191	4 34 47.0	53	198	0 53.6	27				
3 21 00.0	0.988	27 65	3 21 25.9	54	191	4 38 00.7	52	198	0 51.8	26				
3 23 00.0	0.989	29 63	3 23 25.1	53	191	4 41 08.2	51	199	0 50.2	25				
3 25 00.0	0.989	31 62	3 25 24.4	53	190	4 44 10.4	51	200	0 48.8	24				
3 30 00.0	0.990	35 57	3 30 22.6	51	190	4 51 27.9	49	202	0 45.2	21				
3 35 00.0	0.991	39 54	3 35 21.1	50	190	4 58 24.7	48	205	0 42.2	19				
3 40 00.0	0.992	43 50	3 40 19.7	49	190	5 05 04.9	47	209	0 39.4	17				
3 45 00.0	0.993	47 47	3 45 18.4	48	190	5 11 31.0	46	213	0 36.8	16				
3 50 00.0	0.993	50 44	3 50 17.2	47	191	5 17 44.9	45	217	0 34.4	14				
3 55 00.0	0.994	53 41	3 55 16.1	46	192	5 23 48.2	44	222	0 32.2	13				
4 00 00.0	0.994	56 38	4 00 15.1	45	193	5 29 41.8	44	228	0 30.2	13				
4 05 00.0	0.995	58 34	4 05 14.3	44	194	5 35 26.5	43	234	0 28.6	12				
4 10 00.0	0.995	61 30	4 10 13.5	43	197	5 41 03.1	43	240	0 27.0	11				
4 15 00.0	0.995	63 26	4 15 12.8	43	199	5 46 32.2	42	246	0 25.6	10				
4 20 00.0	0.996	66 22	4 20 12.2	42	202	5 51 54.2	42	252	0 24.4	10				
4 25 00.0	0.996	68 17	4 25 11.8	42	206	5 57 09.7	42	258	0 23.6	10				
4 30 00.0	0.996	69 11	4 30 11.3	41	211	6 02 18.9	42	263	0 22.6	9				
4 35 00.0	0.996	71 4	4 35 11.0	41	217	6 07 22.2	42	269	0 22.0	9				
4 40 00.0	0.996	72 356	4 40 10.9	41	224	6 12 19.6	42	274	0 21.8	9				
4 45 00.0	0.996	73 348	4 45 10.7	41	232	6 17 11.8	42	278	0 21.4	9				
4 50 00.0	0.996	74 338	4 50 10.7	40	241	6 21 58.5	42	283	0 21.4	9				
4 55 00.0	0.996	74 329	4 55 10.7	40	251	6 26 40.0	42	287	0 21.4	9				
5 00 00.0	0.996	74 319	5 00 10.9	40	260	6 31 16.6	42	290	0 21.8	9				
5 05 00.0	0.996	73 310	5 05 11.2	40	269	6 35 48.1	42	294	0 22.4	9				
5 10 00.0	0.996	72 302	5 10 11.5	41	278	6 40 14.6	43	297	0 23.0	10				
5 15 00.0	0.996	71 295	5 15 11.9	41	285	6 44 36.4	43	300	0 23.8	10				
5 20 00.0	0.996	69 289	5 20 12.4	41	291	6 48 53.2	44	303	0 24.8	10				
5 25 00.0	0.995	67 284	5 25 13.0	41	296	6 53 05.0	44	306	0 26.0	11				
5 30 00.0	0.995	65 279	5 30 13.7	42	301	6 57 12.1	45	308	0 27.4	12				
5 35 00.0	0.995	63 276	5 35 14.5	42	305	7 01 14.0	45	311	0 29.0	13				
5 40 00.0	0.994	60 273	5 40 15.4	43	309	7 05 10.8	46	313	0 30.8	13				
5 45 00.0	0.994	58 271	5 45 16.3	44	312	7 09 02.3	47	316	0 32.6	14				
5 50 00.0	0.993	55 269	5 50 17.4	44	315	7 12 48.2	48	318	0 34.8	16				
5 55 00.0	0.993	52 267	5 55 18.5	45	318	7 16 28.3	48	320	0 37.0	17				
6 00 00.0	0.992	49 266	6 00 19.8	46	321	7 20 02.0	49	322	0 39.6	18				
6 05 00.0	0.992	46 265	6 05 21.1	47	323	7 23 29.0	50	325	0 42.2	20				
6 10 00.0	0.991	42 264	6 10 22.6	48	326	7 26 48.2	51	327	0 45.2	22				
6 15 00.0	0.990	39 264	6 15 24.1	49	328	7 29 58.5	52	329	0 48.2	24				
6 20 00.0	0.989	34 263	6 20 25.8	51	331	7 32 57.9	54	332	0 51.6	26				
6 25 00.0	0.988	30 264	6 25 27.7	52	333	7 35 43.1	55	334	0 55.4	29				
6 30 00.0	0.986	24 264	6 30 29.8	54	336	7 38 07.4	56	337	0 59.6	32				
6 32 00.0	0.986	22 264	6 32 30.7	55	337	7 38 56.3	57	338	1 01.4	34				
6 34 00.0	0.985	19 265	6 34 31.7	55	338	7 39 37.5	58	339	1 03.4	36				
6 36 00.0	0.984	16 266	6 36 32.9	56	339	.. .. .	...	...	1 05.8	37				
6 38 00.0	0.983	11 266	6 38 34.4	58	341	.. .. .	...	...	1 08.8	40				
6 39 00.0	0.982	8 267	6 39 35.3	58	342	.. .. .	...	...	1 10.6	42				
6 40 00.0	0.980	3 268	6 40 36.8	60	343	.. .. .	...	...	1 13.6	45				

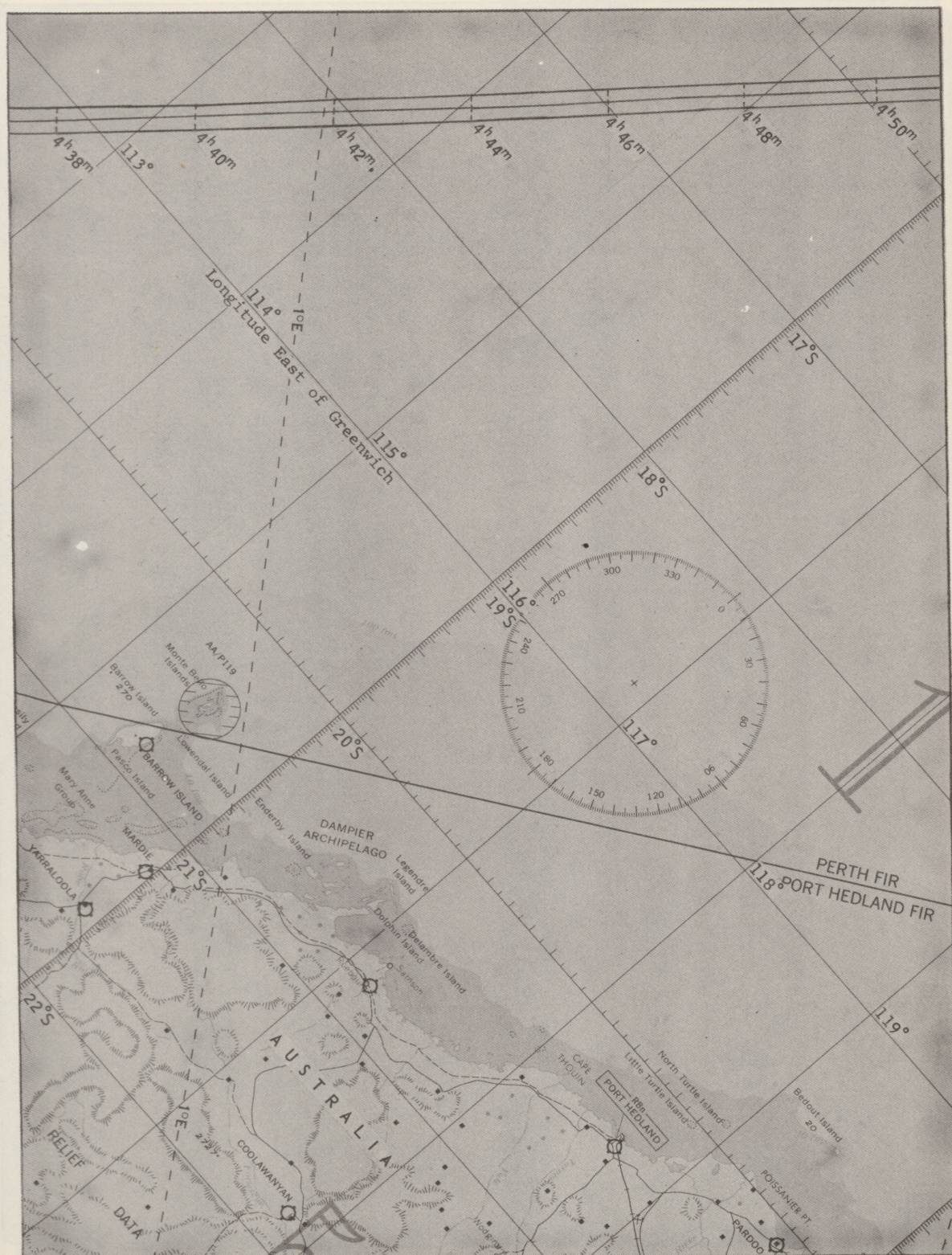
LOCAL CIRCUMSTANCES

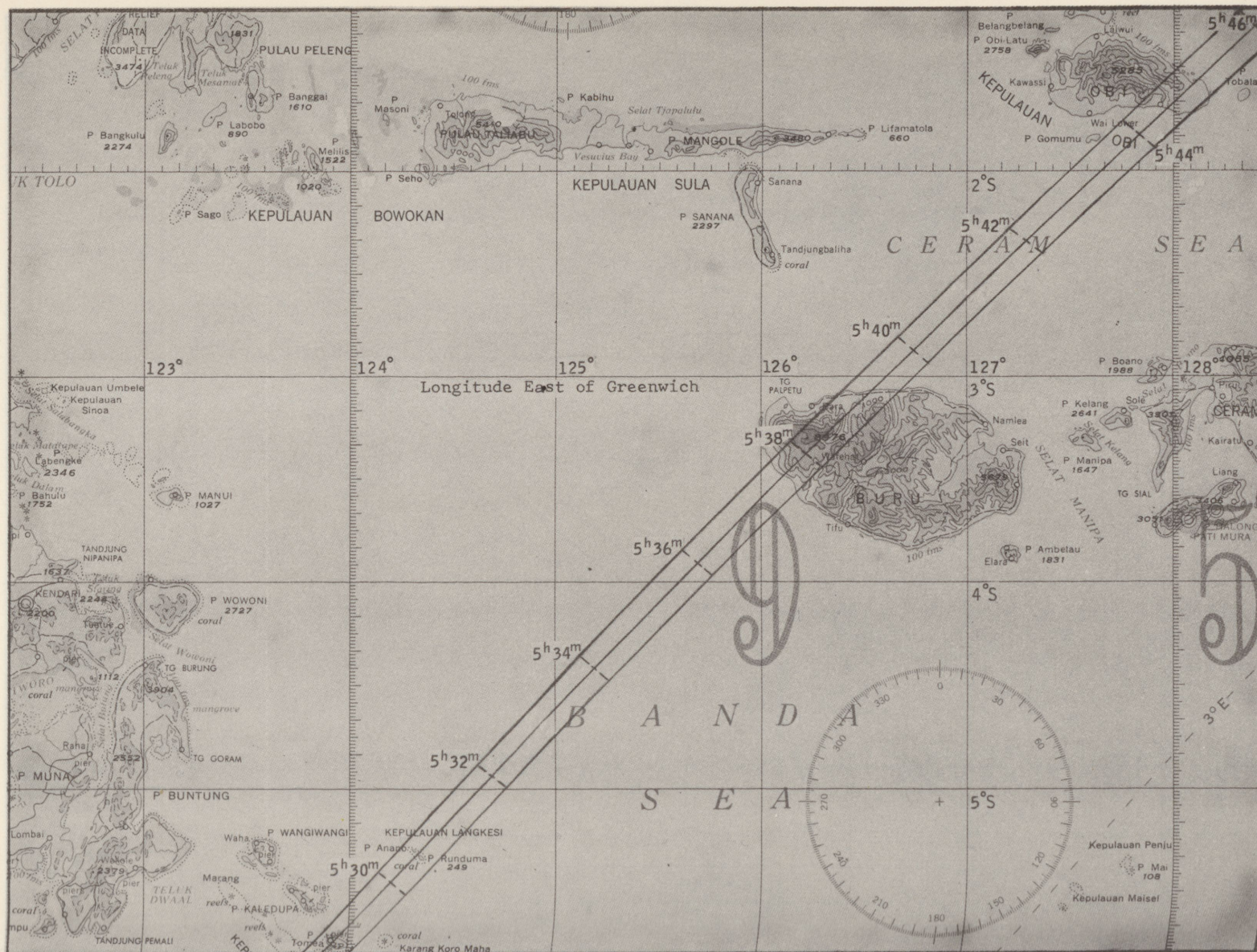
Geographic Locations	First Contact						Second Contact				
	Latitude	Longitude	Universal Time			P	V	Universal Time			P
			h	m	s			h	m	s	
Australia (Page 14)											
Carnarvon	-24 51.0	-113 45.0	2 58	26.3		231	9				
Learmonth	-22 13.0	-114 04.0	3 02	40.9		228	3				
Onslow	-21 41.0	-115 12.0	3 05	36.3		228	5				
Australia (Page 15)											
Mardie	-21 14.0	-115 57.0	3 07	44.0		228	7				
Pardoo	-20 07.0	-119 33.0	3 16	48.9		231	18				
Port Hedland	-20 24.0	-118 36.0	3 14	21.7		230	14				
Roebourne	-20 48.0	-117 10.0	3 10	48.2		229	10				
Yarraloola	-21 34.0	-115 50.0	3 06	59.7		229	7				
Indonesia (Page 16)											
Maumere, Flores Is.	- 8 35.0	-122 13.0	3 44	45.7		221	15				
Waingapu, Sumba Is.	- 9 40.0	-120 16.0	3 38	32.5		219	0				
Indonesia (Page 17)											
Ambon, Ceram Is.	- 3 41.0	-128 10.0	4 07	51.1		224	116				
Bara, Buru Is.	- 3 08.0	-126 15.0	4 05	14.0		220	110				
Namlea, Buru Is.	- 3 15.0	-127 07.0	4 06	41.0		222	114				
Tifu, Buru Is.	- 3 41.0	-126 24.0	4 04	15.8		221	105				
New Guinea (Page 18)											
Sorong	- 0 50.0	-131 17.0	4 20	28.9		225	135				
Palau Islands (Page 19)											
Koror	+ 7 21.0	-134 31.0	4 44	01.5		219	149				
Mariana Islands (Page 20)											
Guam	+13 30.0	-144 40.0	5 10	51.5		222	153				
Marshall Islands (Page 21)											
Eniwetok Atoll	+11 30.0	-162 15.0	5 28	18.8		238	161				
Eniwetok	+11 20.0	-162 20.0	5 28	13.7		238	161				
Bangkok, Thailand	+13 44.0	-100 30.0	4 59	19.3		149	173				
Brisbane, Australia	-27 30.0	-153 00.0	4 49	40.1		290	164				
Broome, Australia	-17 58.0	-122 15.0	3 26	16.0		232	27				
Canberra, Australia	-35 18.0	-149 08.0	4 37	29.3		297	158				
Darwin, Australia	-12 23.0	-130 44.0	3 56	34.1		237	91				
George Town, Malaya	+ 5 26.0	-100 16.0	4 11	53.5		168	239				
Geraldton, Australia	-28 49.0	-114 36.0	2 55	43.6		237	20				
Jakarta, Indonesia	- 6 08.0	-106 45.0	3 28	57.7		197	300				
Kyoto, Japan	+34 59.7	-135 47.6	5 55	43.4		173	130				
Manila, Philippines	+14 36.0	-120 59.0	4 46	48.4		191	158				
Melbourne, Australia	-37 45.0	-144 58.0	4 21	20.2		293	145				
Perth, Australia	-31 58.0	-115 49.0	2 55	45.6		243	31				
Saigon, South Vietnam	+10 46.0	-106 43.0	4 31	08.3		172	204				
Singapore, Singapore	+ 1 20.0	-103 50.0	3 53	06.8		181	265				
Sydney, Australia	-33 55.0	-151 10.0	3 06	36.0		252	51				
Taipei, Taiwan	+25 05.0	-121 32.0	5 22	56.8		175	140				
Tokyo, Japan	+35 40.4	-139 32.5	5 57	07.5		176	131				
Victoria, Hong Kong	+22 16.0	-114 13.0	5 15	55.7		167	142				
Woomera, Australia	-31 11.0	-136 54.0	3 53	24.2		269	111				
Wyndham, Australia	-15 29.0	-128 05.0	3 44	29.6		237	65				

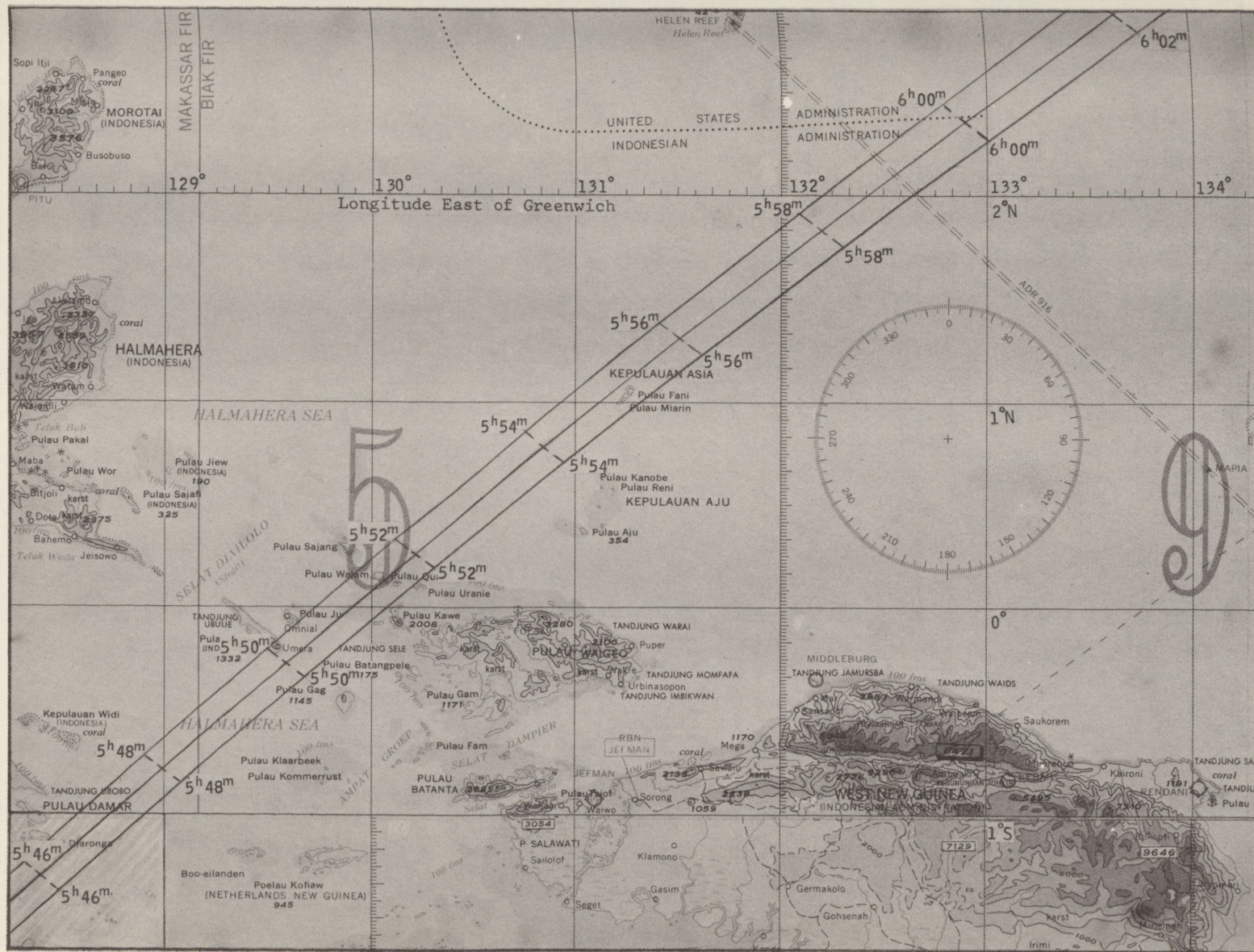
LOCAL CIRCUMSTANCES

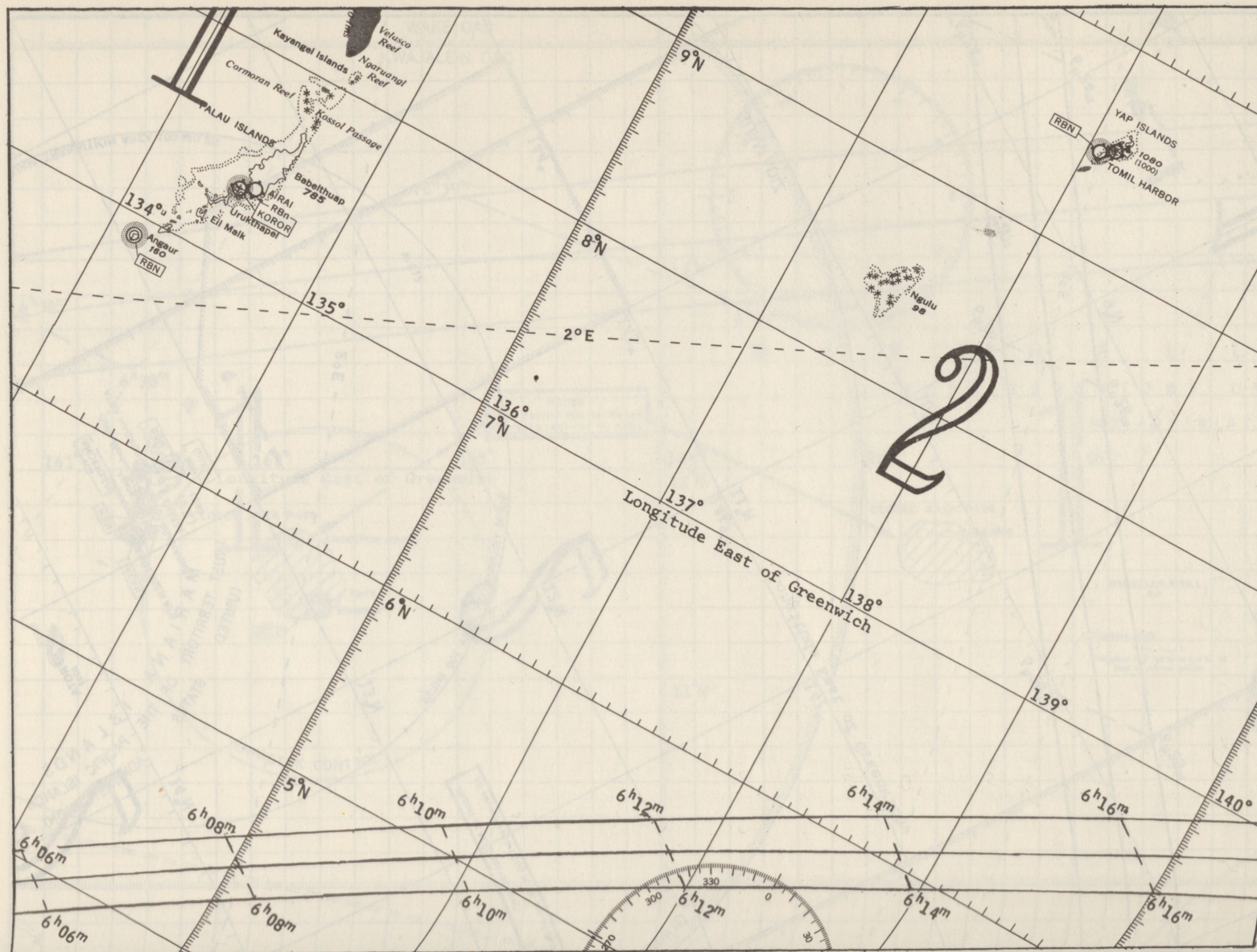
Maximum Eclipse						Third Contact					Fourth Contact				Dura- tion		Width of Path	
Universal Time			Magni- tude	Sun's Alt. Az.		Universal Time			P	V	Universal Time		P	V	m	s	mi	
h	m	s		°	°	h	m	s	°	°	h	m	s	°	°			
4	28	19.1	0.861	66	3						5	58	35.0	35	254			
4	34	05.1	0.906	69	359						6	05	18.7	37	262			
4	37	14.0	0.891	69	353						6	08	12.3	36	264			
4	39	31.9	0.883	70	349						6	10	20.1	36	266			
4	48	28.7	0.824	69	333						6	17	44.9	33	269			
4	46	07.9	0.839	69	337						6	15	52.2	34	269			
4	42	39.7	0.864	70	343						6	13	02.0	35	267			
4	38	37.5	0.879	69	350						6	09	22.0	36	265			
5	19	25.3	0.979	69	290						6	48	14.6	43	301			
5	13	24.1	0.992	71	297						6	43	15.7	43	299			
5	40	38.7	0.951	59	274						7	05	12.9	44	310			
5	38	36.1	0.992	61	274						7	04	07.1	46	313			
5	39	48.5	0.981	60	274						7	04	53.5	45	312			
5	37	40.4	0.987	61	275						7	03	16.1	45	311			
5	51	31.3	0.952	53	269						7	13	28.0	46	315			
6	10	36.3	0.901	44	261						7	27	44.2	56	334			
6	29	12.4	0.863	29	261						7	38	40.3	62	346			
6	37	34.0	0.950	10	267						...	...	...	...	...			
6	37	27.5	0.945	10	267						...	...	...	...	...			
5	29	40.8	0.052	75	183						5	59	44.5	111	82			
5	30	20.9	0.133	32	288						6	09	01.6	353	233			
4	58	08.6	0.803	68	318						6	26	18.8	32	275			
5	08	39.9	0.074	37	300						5	39	03.1	344	212			
5	26	06.4	0.727	58	288						6	48	33.3	31	286			
5	11	10.1	0.209	82	148						6	09	50.5	91	33			
4	22	33.8	0.766	62	4						5	50	04.0	30	243			
4	56	31.6	0.599	85	13						6	23	05.7	63	319			
6	35	37.4	0.154	29	246						7	13	46.2	111	59			
6	03	53.7	0.487	57	245						7	15	12.5	77	7			
4	57	32.3	0.097	40	308						5	32	48.4	346	210			
4	19	22.4	0.681	59	3						5	43	38.4	26	235			
5	34	56.3	0.259	76	216						6	36	38.0	88	25			
5	08	39.9	0.378	87	156						6	23	00.7	78	355			
4	25	08.1	0.543	57	350						5	43	12.4	18	231			
6	17	46.0	0.237	48	237						7	09	34.7	97	40			
6	37	52.0	0.169	26	248						7	16	43.3	110	59			
6	05	38.5	0.173	57	228						6	53	19.4	101	46			
4	56	57.3	0.302	49	312						5	57	40.6	4	234			
5	14	24.2	0.723	62	298						6	38	29.6	30	279			

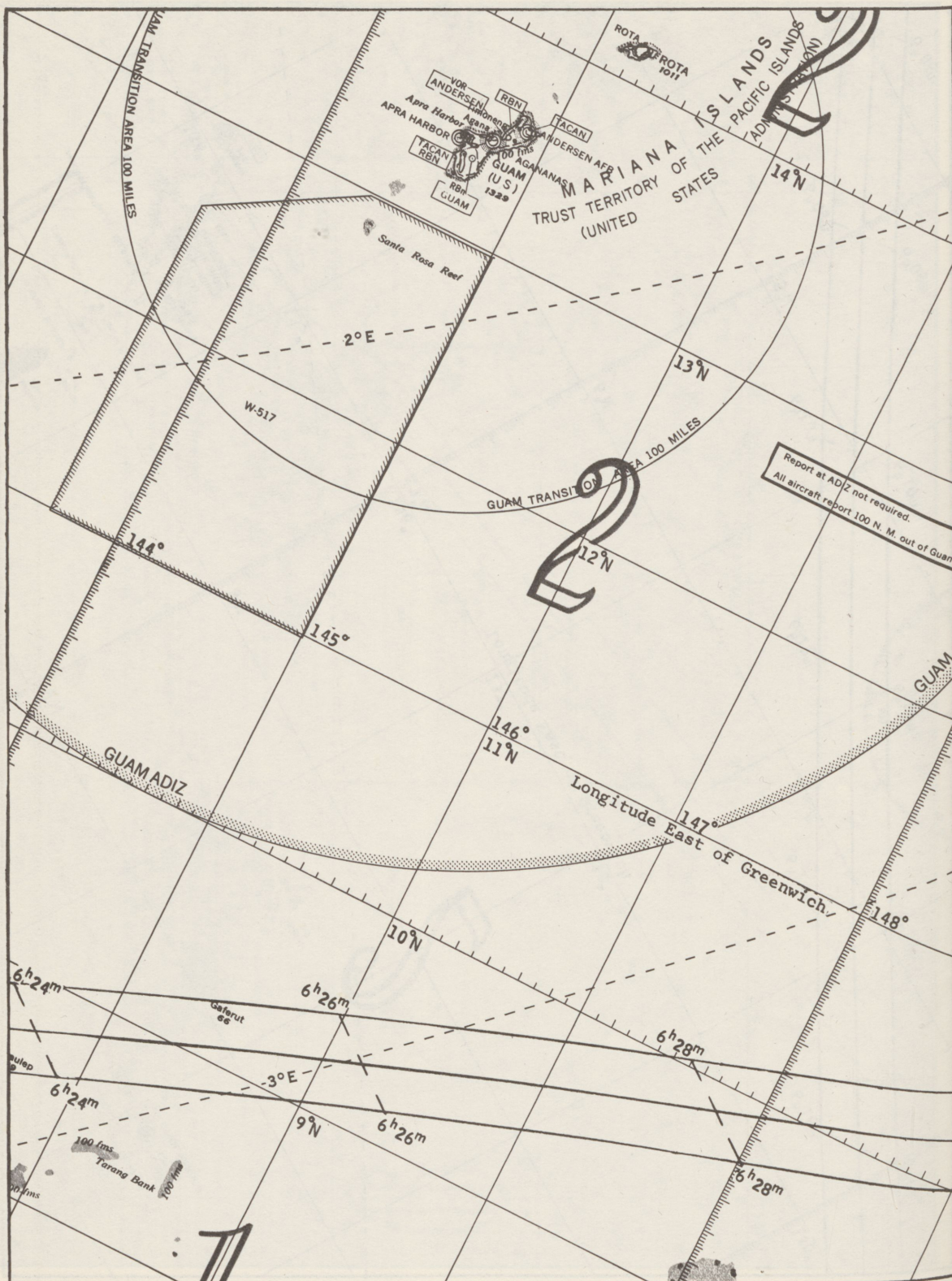


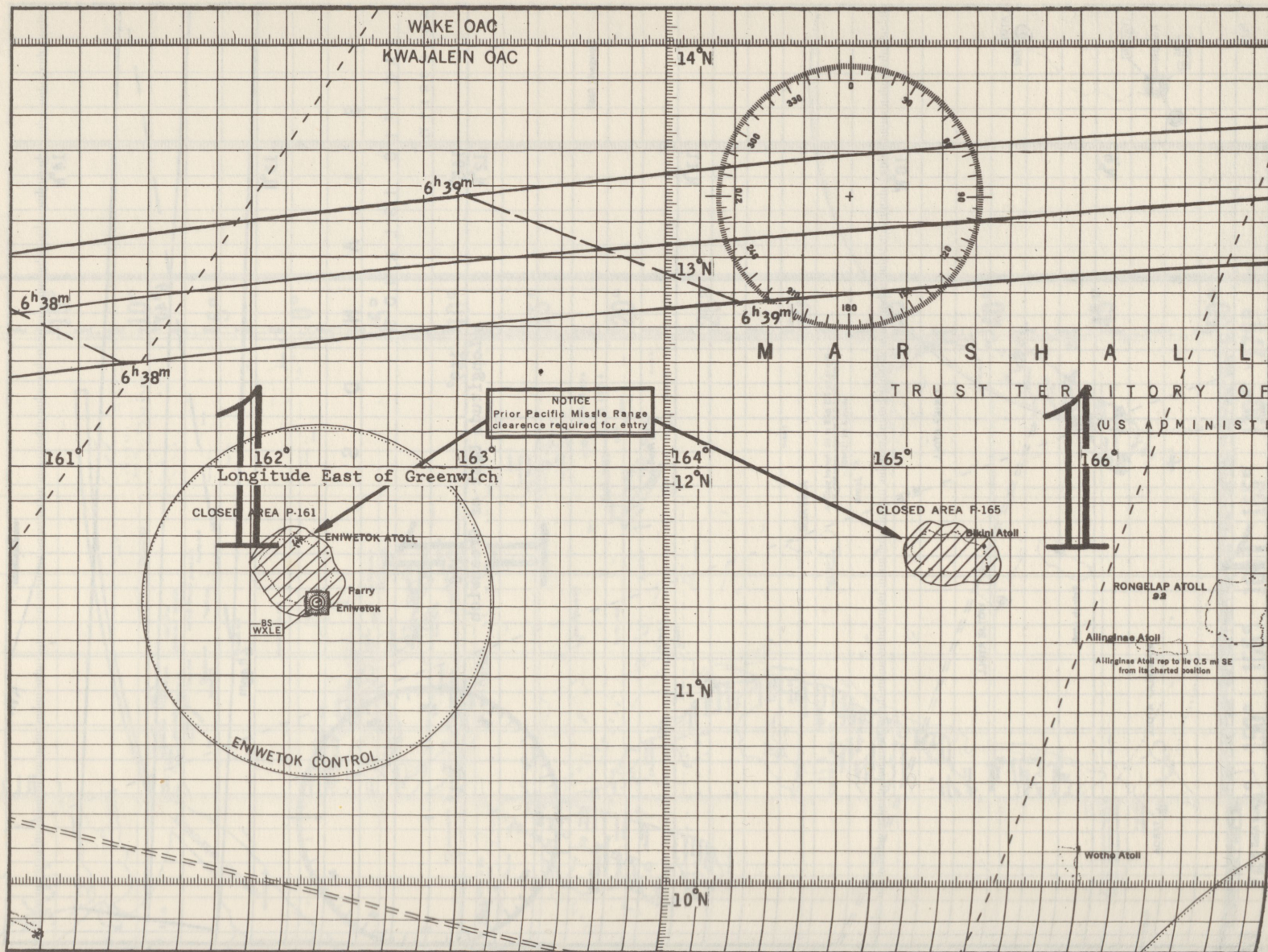


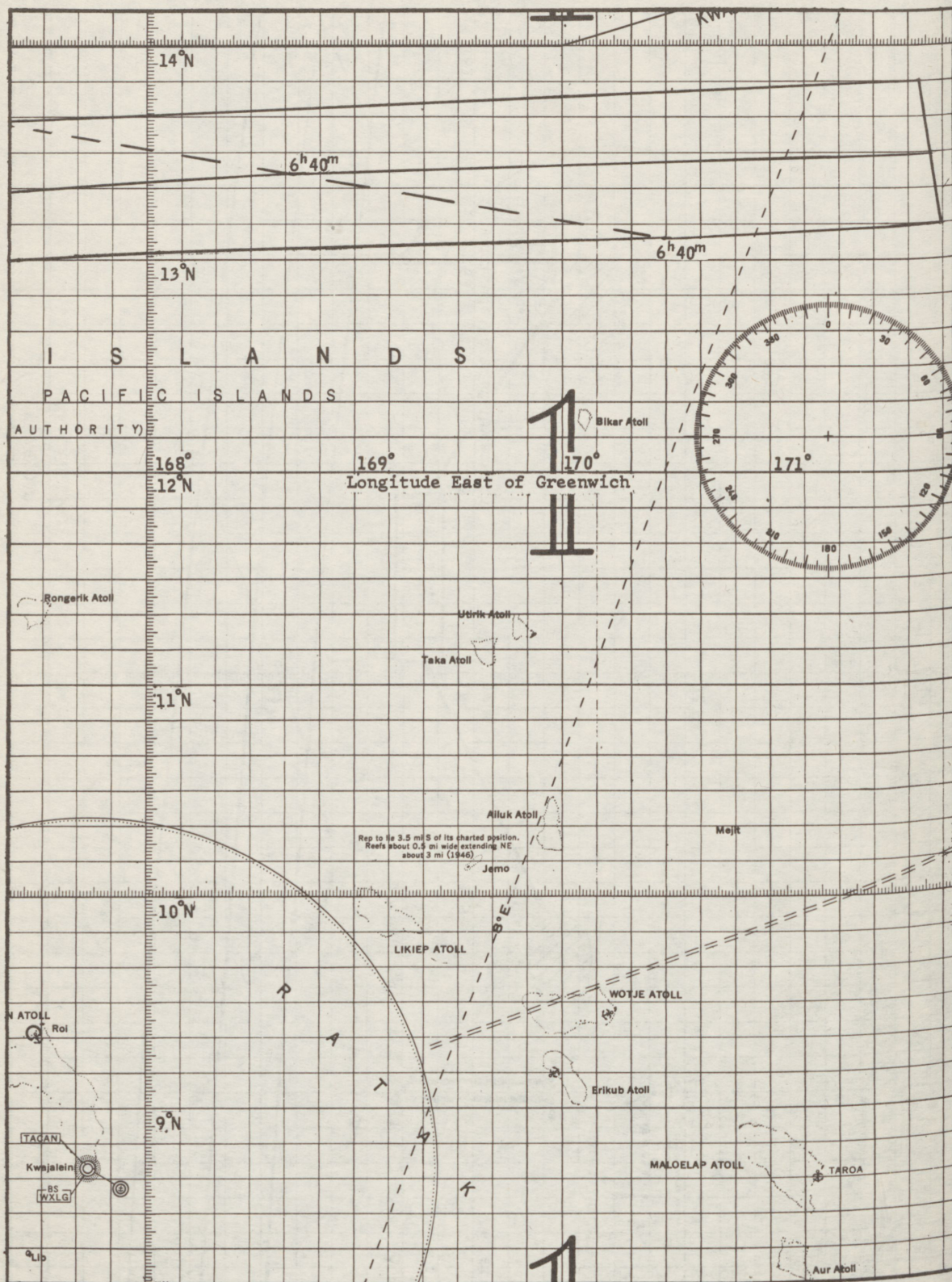












ANNULAR SOLAR ECLIPSE OF 18 MARCH 1969

